Melding astrophysics and support for students

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One night when she was about five, Lab researcher Nicole Lloyd Ronning stared at the full moon outside the barracks where her family lived in Nuremberg, Germany. She imagined herself exploring the Moon and other places in outer space someday.

The Army transplanted her family to a different city every few years. “I wasn't super focused on science-y things growing up. I played a lot of sports, had a lot of interests — but I definitely never stopped wanting to get to space," she says.

Now as an astrophysicist studying gamma-ray bursts, Nicole’s daily routine includes space. Her path was a bit different than she expected, she admits, and deep inside she still wishes for the chance to experience space as an astronaut.

“I have not let go of the dream,” she says.

Winding educational path

Although her parents encouraged her to pursue her dream, they also made it clear that they couldn't buy her a ticket to the Moon. So by age 9, Nicole was banking away money.

"My parents did not push college on us and always said education beyond high school was our choice. If we did choose it, we had to pay for it ourselves," she says. "I babysat, bussed tables, waitressed, whatever it took.“

She also faced another challenge: schools that were not considered academically rigorous.

Looking back, Nicole sees the impact of strong teachers on her life. “My fourth-grade teacher Mrs. Perry took an interest in me when I was having a rough time personally. She gave me a book on exploring space, and made me feel like she believed in me and I had people on my team,” she says.

“It wasn't until late high school — thanks to some amazing teachers — that I discovered I really liked physics and math. That was the route I wanted to pursue in the hopes of becoming an astronaut,” she says.

Nicole made it into the physics undergraduate program at Cornell, an Ivy League research university.

Helping students and early-career researchers

In 2004, a few years after she received her doctorate in physics from Stanford University, Nicole joined Los Alamos National Laboratory as a Director's Postdoctoral Fellow. But then, early in her career, she found herself in a difficult spot and took a long career break.

"I couldn't seem to find that balance as a postdoc with young children, and had trouble finding childcare that worked for our family," she says. "It was a frustrating time, and I decided to take a career break during which I stayed home with my three kids for 10 years."

Now Nicole's using that experience to rally others. Recently, she was a co-organizer of a summer virtual workshop for Laboratory students, postdoctoral researchers and early career scientists on designing their careers.

These days, Nicole is a respected astrophysicist in Computational Physics and Methods (CCS-2) who authors technical papers on gamma-ray bursts and mentors aspiring astronauts.

Her own career, by design, is varied. Nicole spends about half the week at the Lab. She's on the faculty of the University of New Mexico-Los Alamos, where she teaches physics and modern astrophysics. And she's committed to volunteerism through the Lab's Community Partnerships Office. All while co-parenting three teenagers.

"I get the most satisfaction in my life when I feel like I'm really working with people to understand something or improve something — whether it's a science problem, a social justice issue or something else. I also get enormous satisfaction from watching my kids grow up and think for themselves," she says.

Nicole's high school cross country coach instilled a sense of grit in Nicole that carried her through college and beyond.

"She is a Black woman who has had to face things in her life that I will never have to face and that I can only imagine. When I got tired and wanted to slow down or stop, she was having none of that. She taught me how to be strong and keep putting one foot in front of the other when things get tough," Nicole says. "She changed my life."

At Los Alamos, Nicole recalls her coach's example while striving to provide a deep level of support for students from diverse backgrounds as a mentor at the Laboratory, as well as looking for ways to help schoolchildren in under-resourced schools.

Reaching out to Northern New Mexico children

After she had been back to work for a few years, Nicole was contacted by the Lab's Community Partnerships Office to help Taos artist Agnes Chavez who needed an astrophysicist. The next thing she knew, Nicole was involved in a youth workshop on indigenous cosmology and particle physics with STEMarts Lab, the program Chavez founded to deliver sci-art installations and STEAM (science, technology, engineering, math and arts) programming for schools, art and science organizations, festivals or events.

As a Scientist Ambassador with the Bradbury Science Museum, Nicole leads an activity for Santa Fe Indian School students using circuits attached to motors to create a color

wheel. They learned how the electromagnetic spectrum can be used to get different views of the universe with different types of light.

Nicole also makes a series of visits with each year to Española and Santa Clara Pueblo schools. She's drawn to places that resonate with her and her experiences growing up in under-resourced schools. "I feel like I want to tell all those kids, 'You can do this. You'll be OK; don't worry.'"

She is now heavily involved in public scientific outreach, leading efforts at the Center for Theoretical Astrophysics at the Laboratory, and developing programs and regularly doing hands-on physics experiments with students throughout Northern New Mexico.

"I frequently get knocked off my feet by second-graders asking things that get at the core of fundamental physics," she says.

Also a Scientist Ambassador for the Lab's Bradbury Science Museum, she says, "It's been gratifying to engage people who might otherwise not discuss science in their daily lives. And, maybe most importantly, it's made me a better communicator of the things I work on, and why these things might matter to everyone, scientist or not."